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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/749,215	12/27/2000	Patrick L. Connor	10599-367001	5294

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P.O. BOX 1022  
MINNEAPOLIS, MN 55440-1022

EXAMINER
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NGUYEN, QUANG N

ART UNIT	PAPER NUMBER
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2141

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/18/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/749,215	CONNOR, PATRICK L.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Quang N. Nguyen	2141	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-8,10-15,17-24 and 26-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,10-15,17-24 and 26-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

***Detailed Action***

1. This Office Action is responsive to the Amendment filed on 12/14/2006. Claims 1, 12, 15, 22-24 have been amended. Claims 2, 9, 16 and 25 have been canceled. Claims 1, 3-8, 10-15, 17-24 and 26-35 remain pending.

***Claim Objections***

2. Claims 1 and 24 are objected to because of the following informalities:

On line 12 of claim 1: "the transmission rate" should be "the data transmission rate".

On line 12 of claim 24: "the transmission rate" should be "the data transmission rate".

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

4. **Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

5. Claim 1 recites the limitation "adjusting **the relay threshold**" in line 9. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 101***

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. **Claims 24 and 26-35 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

8. Claims 24 and 26-35 are not limited to tangible embodiments. The claims recited "A machine readable medium ..." is nonstatutory since "machine readable medium" could broadly include "transmission-type medium such as digital and analog communications links, wired or wireless communications links using transmission forms such as, for example, radio frequency and light wave transmissions". As such, the claim is not limited to statutory subject matter and is therefore nonstatutory.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. **Claims 1, 3-8, 12, 15, 17-21, 23-24, 26-30 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Kalkunte et al. (5,859,980), herein after referred as Kalkunte.**

11. As to claim 1, **Kalkunte** teaches a method, comprising:

determining the length of a message received from a sending network (*the buffer management unit 18 retrieves information from header bytes identifying the length of the received packet and passes it to the FIFO control 34*) (**Kalkunte, col. 4, lines 6-11 and lines 34-37**);

comparing a data transmission rate associated with said sending network to a data receiving rate associated with a receiving network (*i.e., comparing the total time to fill the FIFO 32 to the corresponding total time to remove the packet from the FIFO 32 or comparing the arrival rate of bytes into the FIFO 32 for each packet to the corresponding removal rate of bytes from the FIFO 32 for each packet*) (**Kalkunte, col. 5, lines 14-48**);

determining an under-run tolerance of the receiving network, the under-run tolerance indicating the extent to which the receiving network will tolerate running out of data during a relay operation (*the FIFO control 34 determines a sufficient number of bytes in the FIFO, referred to as the transmit threshold XMTSP, i.e., indicating the extent to which the receiving network will tolerate the underflow*) (**Kalkunte, col. 4, lines 19-58 and col. 6, lines 53-58**);

if the data transmission rate is less than the data receiving rate (*i.e., if the arrival rate is less than the removal rate*),

adjusting a relay threshold from a first value that minimizes a probability of under-run during relay of the message to a second value that allows a selected amount of under-run to occur during relay of the message, the relay threshold being based on the length of the message, the data transmission rate, the data receiving rate, and the under-run tolerance (*since the transmit underflow/under-run, may occur when the data is removed from the transmit FIFO 32 at a rate faster than the rate at which data is transferred into the transmit FIFO 32, the FIFO control 34 determines whether the transmit start point for the packet should be set at the minimum number of bytes, i.e., at the minimum threshold value  $X_m$ , or whether the transmit start point should be adjusted upward or downward to provide an optimal start point for each packet in order to allow minimum transmit underflow, i.e., allowing a selected amount of under-run to occur*) (**Kalkunte, col. 4, lines 19-58 and col. 6, lines 53-58**); and

initiating relay of said message to a receiving network when a received portion of said message exceeds the relay threshold (*packet transmission is initiated when there*

*are enough bytes in the FIFO, referred to as exceeding the transmit threshold XMTSP)*  
**(Kalkunte, col.4, lines 12-30).**

12. As to claim 3, **Kalkunte** teaches the method of claim 1, wherein determining a length of said message on the basis of information contained in the header of said message *(the buffer management unit 18 retrieves information from header bytes identifying the length of the received packet and passes it to the FIFO control 34)*  
**(Kalkunte, col. 4, lines 6-11).**

13. As per claim 4, **Kalkunte** teaches the method of claim 1, wherein determining a length of said message on the basis of information obtained as part of a transmission protocol *(since data frame following IEEE 802.3 which specifies that a data frame includes 2 bytes of length information as illustrated in Fig. 4)* **(Kalkunte, col. 3, lines 51-62).**

14. As per claims 5-8, **Kalkunte** teaches the method of claim 1, further comprising selecting said receiving/sending network to be a network served by a bus or a packet-switched network *(the interface 10 receives data packets from PCI bus 12 for transmission onto the network bus 14)* **(Kalkunte, col., 3, line 44 – col. 4, line 13).**

15. As per claim 12, **Kalkunte** teaches the method of claim 1, wherein determining said relay threshold further comprises evaluating a quantity derived from said data

transmission rate and said data receiving rate; and weighting said quantity by said length of said message (*i.e., the total time to fill and remove packets from FIFO are calculated based on the arrival rate and the removal rate of bytes into/from the FIFO queue, multiplied by the length of the packet, the time difference between filling and removing is added to a minimum threshold to create a new adaptive transmit start point*) (Kalkunte, col. 5, line 15 – col. 6, line 19).

16. Claims 15, 17-21, 24, 26-30 and 33 are corresponding controller claims and machine-readable medium claims of method claims 1, 3-8 and 12; therefore, they are rejected under the same rationale.

17. Claim 23 is a corresponding system claim of method claims 1 and 3-8; therefore, it is rejected under the same rationale.

### ***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



19. Claims 10 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kalkunte**, in view of **Dixon et al. (US 4,344,132)**, hereinafter “**Dixon**”.

20. As to claim 10, **Kalkunte** teaches the method of claim 1 but does not explicitly teach determining an effective data transfer rate based on the likelihood that receipt of a message would be interrupted.

In a related art, **Dixon** teaches determining a likelihood with which receipt of a message from a sending network will be interrupted (*a bus utilization monitor recognizes when a bus is freer, i.e., less interruptions from other devices trying to send data, or not as free, i.e., more interruptions by other devices trying to send data*) (**Dixon, col. 5, line 31 – col. 6, line 13**); and determining an effective transmission rate on the basis of said likelihood (*multiple devices contending for use of a bus can reduce the effective bus data transfer rate for a given I/O device*) (**Dixon, C1, lines 11-43 and col. 6, lines 14-25**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the determination of the effective transfer rate of the sending network by determining the likelihood of interruption, as taught by **Dixon**, in the **Kalkunte** invention, because knowing this rate would allow the controller of a particular device change the rate the particular device transmits data to be adapted to the current effective transfer rate, reducing the chances for over-runs (*speed control circuitry responsive to the data transfer activity of the data transfer circuitry for causing the*

*device to operate at different speeds for different values of bus availability*) (**Dixon, col. 1, lines 11-43 and col. 5, line 31 – col. 6, line 13**).

21. Claim 31 is a corresponding computer readable medium claim of method claim 10; therefore, it is rejected under the same rationale.

22. Claims 11 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kalkunte**, in view of **Dixon**, and further in view of **Haumont et al. (US 2004/0071086)**, hereinafter “**Haumont**”.

23. As to claim 11, **Kalkunte-Dixon** teaches the method of claim 10, but does not explicitly teach determining the likelihood of interruption based on an analysis of statistics of the usage of said networks.

In a related art, **Haumont** teaches analyzing statistics on usage of a sending network and/or receiving network (*monitoring the network traffic congestion and formulating history of congestion risks*) (**Haumont, Abstract and paragraph 0070**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the analysis of statistical information regarding the congestion (interruptions) of networks, as taught by **Haumont**, when determining the effective bandwidth in the modified **Kalkunte** invention because statistical analysis would allow the controller to analyze the historical patterns of congestions and

categorize them accordingly, as taught by **Haumont** (page 6, paragraph 0070), allowing the controller to make decisions based on what category of congestion it is expecting.

24. Claim 32 is a corresponding computer readable medium claim of method claim 11; therefore, it is rejected under the same rationale.

**25. Claims 13 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalkunte.**

26. As to claim 13, **Kalkunte** further teaches said receiving network including a bus having a bus width (*the buses in Kalkunte inherently have a bus width*).

However, **Kalkunte** does not explicitly teach constraining said relay threshold to be a multiple of said bus width. "Official Notice" is taken that both the concept and advantages of having the relay threshold be a multiple of the bus width of the receiving network are well known and expected in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to constrain the thresholds taught in **Kalkunte** to be a multiple of the bus width of the receiving network because otherwise, when a threshold was reached and data transferred, some bus transactions would contain fewer bits than the size of the bus, making the costly overhead of the bus transaction cost even more per bit, thus reducing communication efficiency.

Art Unit: 2141

27. Claim 34 is a corresponding computer readable medium claim of method claim 13; therefore, it is rejected under the same rationale.

28. Claims 14, 22 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kalkunte**, in view of **Kuo et al.** (US 6,105,079), hereinafter "**Kuo**".

29. As to claim 14, **Kalkunte** teaches the method of claim 1, but does not explicitly teach obtaining said relay threshold from a look-up table.

In a related art, **Kuo** teaches obtaining said relay threshold from a look-up table on the basis of a message length (*select between stored thresholds based on the long bit; wherein the long bit was previously taught to be derived by the length of the data frame*) (**Kuo**, col. 10, lines 3-5).

Therefore, it would have been obvious to one having ordinary skills in the art at the time the invention was made to incorporate the feature of obtaining the relay threshold from a look-up table as disclosed by **Kuo**, into the teachings of **Kalkunte** to reserve/store the relay threshold (*the information that would be often used or reused again and again for a specific pair of sending and receiving network devices or for optimizing a particular long/short frames*) of a specific pair of sending and receiving network devices for easy and quick access.

30. Claims 22 and 35 are corresponding controller and computer readable medium claims of method claim 14; therefore, they are rejected under the same rationale.

### Response to Arguments

31. In the remarks, applicant argued in substance that,

(A) *"Nowhere does Kalkunte suggests that one might want to allow, rather than avoid, under-run"* (see page 13 of the Remarks filed on 12/14/2006).

As to point (A), Examiner respectfully disagrees because **Kalkunte** teaches the transmit underflow (*i.e., under-run*) may occur when the data is removed from the transmit FIFO 32 at a rate faster than the rate at which data is transferred into the transmit FIFO 32, wherein the FIFO control 34 determines whether the transmit start point for the packet should be set at the minimum number of bytes (*i.e., at the minimum threshold value  $X_m$* ), or whether the transmit start point should be adjusted (*e.g., either upward or downward*) to provide an optimal start point for each packet in order to minimize transmit underflow and reducing the latency (*to allow a minimum transmit underflow, i.e., to allow selected amount of under-run instead of to completely eliminate transmit underflow*) (**Kalkunte, col. 4, lines 19-58 and col. 6, lines 53-58**).

Hence, Prior Art does teach or suggest, "one might want to allow, rather than avoid, under-run"

***Conclusion***

32. Applicant's arguments as well as request for reconsideration filed on 12/14/2006 have been fully considered but they are not deemed to be persuasive.

33. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

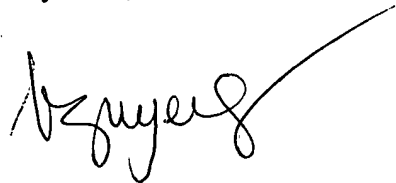
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2141

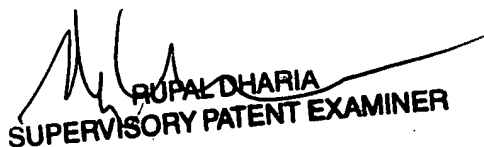
34. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang N. Nguyen whose telephone number is (571) 272-3886.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's SPE, Rupal Dharia, can be reached at (571) 272-3880. The fax phone number for the organization is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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